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The Wolves of Algonquin Provincial Park

A Report to the

Honourable John C. Snobelen,
Minister of Natural Resources

by the Algonquin Wolf Advisory Group

December, 2000

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1.0 Executive Summary

Wolves thrived in central Ontario and the Algonquin Highlands long before the establishment of Algonquin Provincial Park in 1893. Following the extensive logging of the late 1800s and early 1900s, wolves continued to persist despite considerable effort by Algonquin Provincial Park rangers to eliminate them. Abundant populations of beaver and deer allowed high productivity by wolves, and there were as many as 55 packs of wolves in the Park at the middle of the 1900s. Today, the number of wolf packs is estimated at around 30, and research by John and Mary Theberge and their research team has shown the possibility of a decline on the east side of the park from 1987 to 1999.

At the same time, new advancements in molecular genetics have shown that the wolves of a broad area of southeastern Canada, from north of Quebec City west to Manitoba and Minnesota and including Algonquin Provincial Park, are different from the Gray Wolf (*Canis lupus*) found in northern Canada. These southeastern wolves are now believed to be the same as a species that once occurred throughout eastern North America with the proposed name of Eastern Canadian Wolf, *Canis lycaon*. The Eastern Canadian Wolf appears to be extremely closely related to the endangered Red Wolf (*Canis rufus*) of the southern U.S., and is characterized by the ability to hybridize with Coyotes (*Canis latrans*) and with Gray Wolves (*Canis lupus*).

Regardless of the genetics of these wolves, changes in habitat and subsequent numbers of prey (deer, moose and beaver) have affected wolf population dynamics, and also resulted in a lower carrying capacity and thus productivity of wolves in Algonquin Provincial Park. Research on wolves on the east side of Algonquin Provincial Park from 1987 to 1999 showed that considerable human-caused mortality occurred in two contexts: (1) when wolves annually leave the Park during winter months in search of deer in winter yards south-east of the Park; and (2) when the territories of wolf packs overlap Park boundaries. The result was that annual mortality of these wolves exceeded annual recruitment. Population modeling shows that a gradual decline in the wolf population of the Park has a high probability of occurring unless losses are made up by immigration from other areas. The losses that would have to be made up may be as few as 15-25 wolves per year. Reliability of immigration of wolves into the Park in the future is questionable because source populations of wolves outside the park are not protected.

Our investigations of the Algonquin Provincial Park wolf situation have uncovered much uncertainty and much controversy about the future of the wolves in the Park. Part of our fact finding efforts involved a wolf Population Habitat and Viability Workshop (PHVA) attended by wolf experts from Canada and the United States as well as a group of representatives from diverse interests. The workshop provided us with an analysis and review of data, as well as possible solutions for the conservation of wolves of Algonquin Provincial Park.

We believe that Algonquin Provincial Park has a special role to play in the protection of its wolves, and that certain precautions are necessary to ensure survival of Park wolves. Our management recommendations are designed to increase the probability of the wolf population of Algonquin Provincial Park being self-sustaining. Our principal recommendation is to

implement fully an Adaptive Management Plan to conserve wolves in the Park by reducing human-caused mortality. However, we have suggested recommendations for both inside and outside Algonquin Provincial Park to ensure the future sustainability of Park wolves.

2.0 Introduction

2.1 Background to the Issues

After centuries of mistrust and persecution, public attitudes towards wolves are slowly changing. Today, wolves are increasingly viewed by society as an important part of our wildlife heritage. The future of the wolves of Algonquin Provincial Park is of particular interest. Park wolves are viewed as an integral part of a functioning Algonquin ecosystem. In addition, these wolves are of great value as part of the Park's interpretive program. The change in attitude towards the value of wolves is demonstrated by the great public interest in the late summer public wolf howls held in the Park since 1963. In addition to providing an opportunity for educating visitors about wolves, the public wolf howls have contributed greatly to Algonquin Provincial Park's international reputation.

During the last decade, there has been a considerable increase in public concern and resulting debate about the role of Algonquin Provincial Park as a protected area and the long-term conservation of its wolves. Much of this debate stemmed from the results of the radio-tacking and ecological studies in the Park by John and Mary Theberge of the University of Waterloo and their students. Three general concerns have been raised about the long-term viability and integrity of Algonquin Provincial Park wolves. These concerns are that:

i) The wolves of Algonquin Park may be declining because of human-caused mortality when (1) wolves make temporary forays to winter deer yards outside Algonquin Provincial Park, and (2) when the territories of wolf packs overlap Park boundaries.

ii) The wolves of Algonquin Park may be threatened by interbreeding with coyotes dispersing into the Park. This threat would be increased if wolves were killed when outside the Park, and empty spaces in the Park were then invaded by coyotes.

iii) The wolves of Algonquin Park may be genetically unique and restricted to the Park. Thus, small numbers of Algonquin wolves (as few as 150) would be at significant risk of inbreeding, loss of genetic variability or even extinction through local catastrophes.

In response to the concern of excessive mortality, in 1993 the Minister of Natural Resources closed the winter trapping and hunting of wolves in 3 Townships (Hagarty, Richards and Burns) southeast of the Park. This area contains a major deer yard for deer migrating from Algonquin Provincial Park and was identified by the Theberges as the location where most of the killing of Park wolves was occurring. This ban on wolf trapping and hunting was initially deemed to be

successful, but additional research indicated that Park wolves continued to be killed in other areas outside the ban area. The Theberges and a coalition of environmental groups advocated a strategy to conserve wolves that included a wolf protection zone extending outside the Park.

Interest in finding a solution to the conservation issues led the Honourable John C. Snobelen, Minister of Natural Resources, to announce the establishment of the Algonquin Wolf Advisory Group (AWAG) in 1998. The task of this group was to assess the current status of wolves in Algonquin Provincial Park and the issues relevant to their management, and to provide Minister Snobelen with recommendations for an Adaptive Management Plan to ensure the long-term conservation of these wolves. The Terms of Reference for AWAG are attached (Appendix A).

AWAG represents diverse interest groups including local communities, government, trappers, hunters, environmental conservation organizations and the science community. AWAG's membership is as follows:

Bill Calvert (Chair) - local citizen, Huntsville
Alfred Beck - local citizen, Ontario Federation of Anglers and Hunters, Pembroke
Maria de Almeida - biologist, Ministry of Natural Resources, Peterborough
Pete Ewins - biologist, World Wildlife Fund, Toronto
Chris Henschel - biologist, Federation of Ontario Naturalists, Toronto
Jerome Sernoski - local citizen, Barry's Bay
Bill Steer - local citizen, Mattawa
Dan Strickland - biologist, Algonquin Provincial Park
John Theberge - professor, University of Waterloo
Larry Tupling - local citizen, Eagle Lake
Dennis Voigt - wildlife consultant, Lindsay
Laurie Whyte - trapper, Ontario Fur Managers Federation, Lanark

2.2 Activities of the Algonquin Wolf Advisory Group (AWAG)

2.2.1 Background Meetings

AWAG held its first meeting on August 9, 1999. A series of meetings followed (September 21, 1999; November 30, 1999; and January 10, 2000). These meetings provided AWAG with pertinent background information on the status of wolves of Algonquin Provincial Park and the many issues related to their management. They included a series of background presentations by invited speakers on topics such as wolf biology, wolf ecology and genetics, management of wolves in the Park, historic and current management of deer, moose and beaver in and outside the Park, Park's management plan, forestry practices and adaptive management.

2.2.2 PHVA Workshop

On February 15-18, 2000, AWAG hosted a wolf Population and Habitat Viability Assessment (PHVA) workshop at the Leslie M. Frost Natural Resources Center near Dorset, Ontario. The main goal of this intensive three and one-half day workshop was to provide AWAG with input and an independent review of the available scientific data on Park wolves.

The PHVA workshop process has been used worldwide as a tool to help resolve societal-wildlife conservation issues. To date over 200 workshops of this kind have been held in over 50 countries. The PHVA process consists of bringing together a broad group of participants to:

- take an in-depth look at the population's life history, status and dynamics, and assess the threats to the population
- identify and examine the key issues affecting the conservation of the population
- develop recommendations and strategies to address the key issues, and
- specify the action steps necessary to implement the recommendations.

The workshop was attended by a diverse group of over 60 people including the members of AWAG, biologists, researchers and geneticists from universities, colleges, the Ontario and Quebec governments, and Canadian and U.S. federal governments. In addition, a large number of participants represented local, provincial and national interests including local communities, First Nations, private conservation organizations, hunting, trapping, outfitting and agricultural and educational interests among many.

The workshop was facilitated by a team of five facilitators from the *Conservation Breeding Specialist Group* of the Species Survival Commission, World Conservation Union (IUCN). Funding was provided jointly by the Ontario Ministry of Natural Resources and the World Wildlife Fund Canada with assistance from the Canadian Wildlife Service of Environment Canada.

The workshop consisted of a morning of background presentations, followed by three days of working group sessions on the main topics identified by the participants: (1) Taxonomic Status, (2) Population Dynamics and Modeling, (3) Prey Habitat, (4) Landscape Ecology and (5) Human Values. Each working group presented the results of their work in daily plenary sessions, and produced a written report of their findings and recommendations. These reports were collated in a final workshop report. Not all the recommendations resulting from the workshop were accepted by all participants. Participants that could not agree with the recommendations were offered the option of writing dissenting opinions for inclusion in the report (3 dissenting opinions were included). The PHVA report was received by AWAG for consideration on August 10, 2000.

2.2.3 Development of Report to Minister John C. Snobelen

AWAG held a series of meetings (May 16, June 1, June 26, July 19, August 10, September 7 and October 30) following the PHVA workshop to develop and prepare its report to the Minister of Natural Resources.

In those meeting, AWAG reviewed the available scientific data, the analysis of the data, the findings of the PHVA workshop and the input received from a broad selection of interests. Following these deliberations, AWAG developed the twenty-four recommendations included in Section 5.0 of this report. The majority of these recommendations are unanimously supported by all AWAG members. In the case of Recommendation 18, a consensus process established by AWAG was used to achieve compromise (requiring a two-thirds majority vote when unanimous support was not possible).

3.0 Wolves in Algonquin Provincial Park

3.1 Numbers of Wolves, their Behavior and their Interactions with Prey

The Pimlott study in the early 1960s estimated that there were about 55 wolf packs in Algonquin Provincial Park, numbering about 300 individuals in mid- to late-winter (the annual low point in the population before the birth of new pups). By the early 1970s, however, following a major decline in the Park deer population, summer and winter censuses indicated a wolf population consisting of, at most, 75% of the population that existed before the deer crash. A further apparent decline in the mid 1970s led to a situation, in the late 1970s and early 1980s, where wolves were very difficult to find and the success of the Public Wolf Howls was low. Starting in 1985, and apparently coinciding with a slight recovery of the deer population, Park staff have located a minimum of four packs every year along Highway 60, and success on Public Wolf Howls has been distinctly better than in previous years. Sightings of packs and individual wolves made by staff and the public along the Highway 60 corridor on the west side of the Park were as high or higher in the late 1990s than at any other time in the last 30 years. However, the most intensive measures of wolf numbers have come from the studies of east side wolf packs by the Theberges and their students. Using those data and extrapolating to the entire Park, the present best estimate of the entire Park wolf population is 30-35 packs, with about 150 animals at winter's end. This number approximately doubles to about 300 wolves with the birth of pups (one litter per pack), and then declines through mortality and emigration back down to 150 wolves at the end of the following winter.

In 1987, John and Mary Theberge of the University of Waterloo and Ph.D. student Graham Forbes began to study wolves on the northwest, southern and eastern sides of Algonquin Provincial Park. They discovered that many east side packs made long distance forays to the Round Lake area outside the Park in late winter to kill deer (most of which also originate from within the Park but spend the winter in the Round Lake "deer yard"). In some years, significant

numbers of radio-collared Park wolves were killed by hunting and trapping when outside the Park. In response to these findings, in 1993 the Ministry of Natural Resources imposed a ban on the killing of wolves in the three townships containing the deer yard from December 15 to March 31. This includes most of the period when deer are in the yard and east side Park wolves are likely to be exposed to hunting and trapping.

Over the period 1987-99, in contrast to the observations for the west side cited above, the Theberges' monitoring of the east side wolf population showed much fluctuation in numbers and suggested an overall decline. This included the period following the ban on the killing wolves in the Round Lake deer yard in1993. Despite a drop in estimates of wolf density, the data analysis oy the Theberges did not show a statistically significant decline. Following the PHVA workshop, an analysis by Vucetich and Paquet (2000) of the Theberges' data concluded that there was an 84% probability that the population had declined and a 16% probability that it had increased. Computer simulations carried out at the PHVA workshop also suggested, on the basis of reasonable guesses about wolf pup production and mortality, that the east side population might be losing more animals each year than it was producing. If this were true, it would mean that the wolf population in the east side of Algonquin Provincial Park is acting as a "sink" – as opposed to a "source" of wolves. Biologists use the term "sink" to designate a wildlife population that relies on immigration from outside areas to maintain the population. A "source " population produces enough young to maintain the local population as well as a surplus that can emigrate and help to maintain nearby populations. It is interesting to note that the killing of wolves by Park rangers for over 60 years up until 1959 did not appear to cause a decline in wolf numbers and thus cause the park to operate as a "sink". This suggests that the production within the Park and survival of wolf pups during this era of high deer numbers was able to offset losses. Various other studies have shown that up to 40% of wolf numbers can be killed without reducing a population, but such high mortality requires high productivity by wolves and an abundance of prey.

The research described above and the results of the workshop suggest that the east side Park wolf population would decline in the long-term unless numbers are replenished through immigration. The evidence for immigration is contradictory. The Theberges' ecological studies did not demonstrate immigration, but the genetic studies show that a significant number of the wolves in the Park may have originated elsewhere. However, it is not clear what proportion of immigrants are wolves similar to Park wolves as opposed to hybrids or northern Gray wolves. The modeling in the workshop assumed that east side and west side Park wolf populations were similar. It also assumed that there was no replenishing from west side to east side or from elsewhere. Regardless of these assumptions, we do not know if other areas are acting as a source and whether these areas will continue to do so in the future.

The Algonquin Provincial Park area of 250 years ago had a prey base that was almost certainly different from that of today. Moose were probably the dominant ungulate, with Woodland Caribou extending into the Park area from the north and Elk from the south. At that time, White-tailed Deer were confined to southwestern Ontario and the area north of Lake Ontario, as far inland as Peterborough. However, deer responded favourably to the land clearing, logging and

the more frequent forest fires that accompanied European settlement, and by the beginning of this century their range extended into northern Ontario. Deer were the dominant ungulate throughout Algonquin Provincial Park from 1900 to 1970 when they declined due to a series of severe winters and changes in habitat. Moose increased to very high densities shortly after that and have become the dominant ungulate. Today, deer are regularly seen in the summer in the Park but very few spend the winter there. In a similar fashion to deer, beaver were common in the Park until the 1960s. Changes in habitat have also caused declines to levels less than half of what they were then (MNR Surveys 1998, 1999). These declines have occurred throughout the Park but are most noticeable in the western uplands. Habitat changes include a maturing upland forest of tolerant hardwoods, less early succession forest species such as poplar and white birch (favoured by beaver) and increases in conifer forests in riparian reserves.

3.2 Taxonomy of Wolves - What is the Wolf of Algonquin Provincial Park?

In 1970, Ontario government scientists Rod Standfield and George Kolenosky observed that the wolves occupying Ontario from the Quebec border to Lake Superior and from the southern Shield area north to about Timmins are noticeably smaller and more uniformly coloured than wolves living farther north in the province. Standfield and Kolenosky postulated that the wolves in this area (which includes Algonquin Provincial Park) probably constituted a previously unrecognized race or subspecies of the Gray Wolf *(Canis lupus)*. When the wolves of south central Ontario were recognized as being distinct in 1970, it was also noted that the northern limit of their range coincided with that of White-tailed Deer. Deer and beaver together make up the majority of the diet of these wolves. It does appear that the small wolves now occupying south-central Ontario (including Algonquin Provincial Park) may be capable of preying on moose, but that they clearly seek smaller prey like deer as do wolf populations elsewhere where deer are available - witness the annual excursions by these wolves outside of the Park in search of deer. It is unknown what the original wolf and prey system was in the Park during pre-settlement times. However, it is now clear that there have been large shifts in both prey species and the *Canis* species inhabiting central Ontario.

In a review of wolves in 1995, Ron Nowak, who is an expert wolf taxonomist, identified 5 Gray Wolf subspecies in North America. The wolf that Standfield and Kolenosky described in central Ontario was accepted as a subspecies with the name *Canis lupus lycaon.*

Most recently, geneticists Brad White and Paul Wilson of McMaster and Trent Universities have suggested, using DNA evidence, that the wolves that Standfield and Kolenosky identified extend even farther west (into Manitoba and Minnesota) and east (to north of Quebec City) than originally described by Standfield and Kolenosky (Figure 1). They have also proposed that, rather than being a small race of the Gray Wolf, the small Manitoba to Quebec wolves are part of a different species that is essentially the same as the Red Wolf *(Canis rufus)* of the southeastern U.S. They propose the English name Eastern Canadian Wolf and the scientific name *Canis lycaon* to designate the taxon that would include both the endangered Red Wolf and the small Manitoba to Quebec wolves. This new view has recently been accepted for publication.

The new genetic research clearly shows that the *Canis* species complex in Ontario is very complex, involving considerable hybridization and shifts in range. Coyotes seem to be the most adaptable species, able to withstand human-caused disturbances and even thrive and expand their range. Gray Wolves seem the least adaptable to withstand disturbances, and their range appears to be shrinking from that of historical times. The latest DNA analysis suggests that *Canis lycaon* range may not be as large as in pre-settlement times, but certainly larger than was thought even 10 years ago. It has become clear that the wolves of Algonquin Provincial Park are not an "island" population restricted largely to the Park. Rather, they are deemed to be part of a much more widespread (Manitoba to Quebec) population that numbers in the thousands and is hybridized with gray wolves in northern Ontario and coyotes in southern Ontario. The issue that is emerging is that this population may be undergoing varying degrees of gray wolf and coyote gene introgression. Nonetheless, Algonquin Provincial Park is the largest area that currently gives nominally complete protection to these wolves.

4.0 Addressing Issues of Wolf Conservation and Management

4.1 The Role of Algonquin Provincial Park in the Conservation of Wolves

Algonquin Provincial Park is a unique natural environment Park that plays a key role in the conservation of forest landscapes in central Ontario. Algonquin is the largest area protecting wildlife in the Great Lakes-St. Lawrence Forests of Canada. Furthermore, it is the largest protected area for *Canis lycaon* that exists. The Park has proven to be excellent for both education and scientific studies during the last half-century, and has the potential to continue to serve these purposes this millennium. Certainly the wolves are a major attraction for visitors to the Park. Ecologically, wolves are an integral part of the Park's ecosystems and a keystone species as the top mammalian predator. It is widely believed that places such as Algonquin Provincial Park should act as a source of populations and not as sinks which require immigration in order to be maintained.

Many people believe that wolves should be protected just because they are Park wolves, and that they deserve that protection even if there are no problems at all with declining numbers, swamping by coyotes, or vulnerability because of a small population size. For these people protection of wolves is a question of principle, and stems from their beliefs in the role of Parks. On the other hand, some people – presumably less numerous than 50 to 100 years ago - believe wolves should not be given extra protection even if there was incontrovertible evidence that Park wolves are presently endangered. Some of these people do not believe that wolves have any intrinsic value, or they view them as competitors for other resources - witness the killing of wolves as a major preoccupation of Algonquin Provincial Park rangers after the Park was established in 1893. Earlier this century, the rangers were strongly backed by public opinion as they trapped, snared, poisoned and shot an average of 55 wolves (about 18 % of the population) every year within Park boundaries. The general belief was that lowering or eradicating the wolf population would lead to increases in the already high deer population. Protection of wolves began in 1959 when the Ontario Government began a major study of the ecology and behaviour

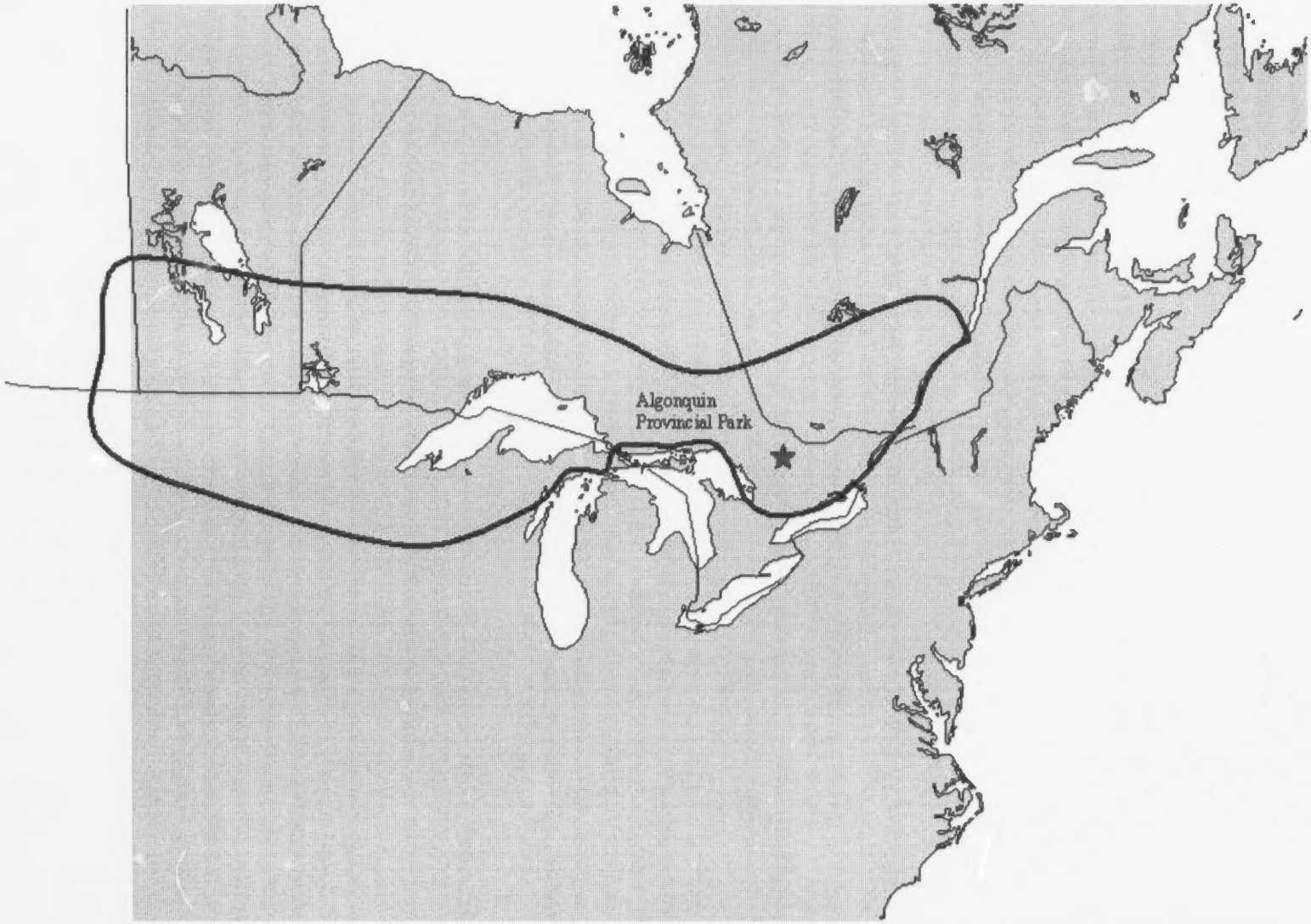

Figure 1. Estimated distribution of the Eastern Wolf (*C. lycaon*) in North America (Source: Natural Resources DNA Profiling and Forensic Centre, Trent University, Peterborough).

of wolves under the leadership of the late Dr. Douglas H. Pimlott. This research and various other wolf studies during the period began to change public attitudes towards wolves in much of North America.

A key discovery during the Pimlott study was that wolves would answer human imitations of their howls. That permitted the locating of wolves in the summer when wolves were hard to study. It also led to the birth of Algonquin Provincial Park's famous Public Wolf Howls. During these events as many as 2,500 people are given a wolf talk and led on a car expedition to a location where a pack of wolves has been located the night before. An attempt is made to get wolves to answer imitation howls by Park staff. By 2000 over 110,000 people had participated in the 85 Algonquin Public Wolf Howls held since 1963. Public wolf howls are the cornerstone of the Park's wolf education program that makes over 300,000 contacts annually through a mix of publications, exhibits, slide talks and special programs for school children. Although Public Wolf Howls in Algonquin Provincial Park are just part of this program, they are probably the most effective and popular contribution by Ontario in changing public attitudes towards wolves from being very negative forty years ago to being much more positive today.

We believe that the need for extra protection and the degree of risk to the population of wolves are important to understand in order to make appropriate management recommendations. There are several considerations to assess that risk and determine what form extra protection should take or how useful it would be.

4.2 Summary of the Risks to the Wolves of Algonquin Provincial Park

We believe that there is reasonable evidence that the wolves of Algonquin Provincial Park declined between the early 1960s (when studied by Pimlott and others) and the late 1980s and 1990s (when studied by the Theberges and others). A major factor appears to have been the large shift in prey base with fewer deer in the Park in summer, but especially in winter, as well as a decline in beaver numbers. Nonetheless, beaver constitute a large part of the diet of these wolves. While moose have increased, they are not as vulnerable to predation as deer and beaver. We note that the deer population declined across most of eastern North America in the 1970s, and not just in the Park after wolf protection. Similarly, beaver have declined over a large area and moose have increased, although these changes have been more dramatic in the Park than elsewhere. Because of the overall decline in prey and wolf numbers, risks to the sustainability of the Algonquin wolves have increased.

During the Theberges' wolf studies the east side Park wolf population showed much fluctuation and probability of an overall decline even after 1993 when the ministry imposed a ban on the winter trapping and hunting of wolves in the 3 townships southeast of the Park. Mortality is primarily human-caused, and overall mortality is higher than recruitment. Other evidence such as declining pack sizes also suggests uncertainty about the future of the east side Park wolf population. Wolf densities are unknown in the west side of the Park, although there has been a minimum of 4 packs along the Highway 60 corridor every year since 1985. Since habitat on the

Park's west side is less suitable for deer and beaver, it is unlikely that prey numbers and thus wolf reproduction is better on the east side. Mortality may be lower only if those wolves stay inside the Park.

We have no evidence that disease is currently playing a role in reducing wolf survival, although we note the evidence of exposure to canine parvovirus in Park wolves.

Mortality of wolves leaving Algonquin Provincial Park is clearly one of the most important factors identified in the population dynamics of wolves in the Park. It is likely that wolves are leaving the Park during winter on several fronts, even though direct evidence is only available from the east side. Regulating the mortality of wolves outside the Park during the period when they are likely to leave the Park may be one of the most critical management actions that is feasible. The additive nature of the human-caused mortality before spring recruitment appears to be the extra stress that puts this population at risk.

A critical question about the wolves in Algonquin Provincial Park, if they are at long-term risk at least in parts of the Park, is what can be done to increase survival. Improving prey habitat will eventually improve prey populations and hopefully wolf productivity. At present, the management of the Park is designed to foster natural ecosystem processes. Timber management prescriptions are designed to mimic natural disturbances, and are producing forests different than the forests of earlier this century although perhaps more like historic conditions. Changing Park forests to produce better deer and beaver habitat would require fundamental changes in the current Park's objectives and policies of ecosystem management and forest management for the production of high quality timber products that are critical to the economy of central Ontario. It would require much more extensive logging, including cutting close to shorelines, to enhance beaver habitat and increase protection of critical deer winter cover in conifer stands. In addition, a reduction in wild fire control would be favorable for better deer and beaver habitat. While many of these actions could be considered, it is not clear how extensive they would have to be in order to produce long-term and sustained changes in prey numbers.

The evidence of whether areas outside Algonquin Provincial Park are helping to bolster the Park's wolf populations is unclear. It is also unclear whether wolf survival is better outside than inside the Park. The computer simulation modeling exercise did not consider wolves immigrating from outside Algonquin Provincial Park. We do, however, find it desirable that Algonquin Provincial Park should have a self-maintaining population of wolves, and that the Park's wolves should be maintained in numbers that the prey and their habitat can support.

Genetic swamping of *Canis lycaon* by coyotes may be a major issue throughout the southern portion of their range. Algonquin Provincial Park could play a key role in minimizing this effect in central Ontario. The most recent genetic research indicates that coyote introgression into the wolves of Algonquin Provincial Park has occurred in the past, although the geneticists do not believe that this is still occurring at a high rate under present conditions. Nonetheless, some coyote-like animals, including breeding females, have been observed in the Theberges' radio-telemetry based study but it is unknown whether this has been corroborated by genetic evidence.

Outside the Park wolves do not appear to thrive in highly fragmented, high road density and high human density areas, but both coyotes and hybrids appear to thrive in those areas. It appears that townships that are highly fragmented may favour coyotes but the converse, that highly forested townships favour wolves, may not be true. Furthermore, history has shown that wolves are relatively sensitive to human-caused mortality, but coyotes are notoriously insensitive. Thus, the threat of coyote expansion into the Park is always present and enhanced by human exploitation. Regulations that favour wolves, but target coyotes and hybrids, would reduce the risk of hybridization of wolves.

All the available evidence currently suggests that wolves of the type that now exist in Algonquin Provincial Park are not restricted to the Park. While not completely resolved, the DNA evidence suggests that the wolves of Algonquin Provincial Park are part of a group of wolves that extend from Manitoba through Quebec, as far north as Timmins and as far south as Haliburton. The wolves that occur north of Algonquin Provincial Park have a higher degree of *Canis lupus* genetic introgression, whereas the wolves to the south have a higher degree of *Canis latrans* introgression.

The wolves of Algonquin Provincial Park have significant values to many people at local, provincial and international scales. A review of the evidence suggests that there is risk that the population may be threatened unless a conservation plan for the future is implemented now.

4.3 Options for Conserving the Wolves of Algonquin Provincial Park

Adaptive management (AM) has been recommended as a method to help conserve the wolves of Algonquin Provincial Park. Adaptive Management is a process that uses the scientific method to improve policy by learning from the outcome of implementing policy. It has been suggested for broad-scale and complex resource management issues where it is difficult to understand all the interacting factors. Ideally, alternative management policies are tested with a rigorous evaluation and monitoring program. While not the same as research that focuses on causes and effects, such active adaptive management is nonetheless a large-scale experiment. In considering various options, we reviewed a proposed large-scale experiment involving manipulation of hunting and trapping in different zones around Algonquin Provincial Park over a 6-year period, and including detailed monitoring of wolves and their prey inside and outside the Park. It appears that not only would this option be very expensive ($100,000 -200,000 per year), it would be time-consuming, delay widespread conservation, and perhaps still be challenged scientifically. The alternative is passive adaptive management, involving regulatory changes designed for the "best bet" conservation action, which would include a commitment to monitoring the long-term trends in both prey and wolves to learn how effective the conservation actions are.

During our deliberations, we received many diverse suggestions for the management of wolves in Algonquin Provincial Park. These varied from complete protection to no protection. Some believed that only solutions within Algonquin Provincial Park should be considered, whereas

others recognized that the Park is not an island and that wolves travel freely in and out. We considered this large variety of options, and developed our recommendations with these in mind.

5.0 Recommendations for the Management of the Wolves of Algonquin Provincial Park

This section presents our recommendations for the management of wolves both inside and outside Algonquin Provincial Park. The wolves of Algonquin Provincial Park are part of a larger population that extends beyond the boundaries of the Park. However, Algonquin Provincial Park plays a special role as a unique Provincial Park that strives to maintain wildlife and ecosystems in a natural environment. While protection of wolves that roam far from the Park may be difficult, wolves that temporarily leave the Park or live primarily in it should be afforded a high degree of protection.

The recommendations that follow are designed to ensure that wolves continue to play their ecological role while inside Algonquin Provincial Park, and a reasonable assurance of their sustainability despite their excursions outside the Park.

The Advisory Group considered two alternative, strategic approaches to satisfying the Terms of Reference requirement for an Adaptive Management Plan. The alternative approaches considered were:

i) Active Adaptive Management - an experimental design option involving evaluation of alternative management policies and experiments in different places and times to tests different policies. That design required intensive studies to evaluate the differences between experiments; and

ii) Passive Adaptive Management - a management option that implements the best policy option including regulatory control of wolf mortality and monitoring of the effects on wolves over time. The Plan would specify the timing and location of season changes.

On the basis of an overview assessment of the two approaches, their respective abilities to effectively address the current significant risks to the wolf population in timely fashion and their relative cost and feasibility, it was determined that the Passive Adaptive Management approach should be pursued in the development of the Adaptive Management Plan.

5.1 Principal Recommendation

We recommend implementation of a long-term Adaptive Management Plan for the wolves of Algonquin Provincial Park to significantly reduce the risk of population decline arising from

human-caused mortality, and to maintain the wolf population at a level which is consistent with the long-term carrying capacity of the Park.

Although several factors have affected the population of wolves in Algonquin Provincial Park, our review of all available information indicates that the nature of human-caused mortality in the winter has increased the risk that the population could undergo a long-term decline. The best scientific estimate of the critical action required to eliminate the risk and ensure sustainability of the population (at 30 to 35 packs comprised of 150 animals at winter's end) is to reduce human-caused mortality of Park wolves by about 10 to15 per cent of the population. This essentially amounts to a reduction in trapping and hunting of wolves in their excursions from the Park. Reductions in mortality of about 15 to 25 animals per year would be distributed over an area of nearly 6,000 square miles, including the Park and surrounding heavily forested landscape.

The plan would feature modest regulation of trapping and hunting of wolves, provide for the management of wolf prey and their habitat as is feasible, and improve public education and communication that would raise the focus on wolves and their management needs. Included would be a new monitoring scheme, inside and outside the Park, which would:

i) Determine the effect of regulations and other management prescriptions;

ii) Ensure the long-term sustainability of the globally significant wolves of Algonquin Provincial Park; and

iii) Allow adaptations in management in the future based on scientific findings.

5.2 Recommendations for Management Inside Algonquin Provincial Park

5.2.1 Trapping and Hunting of Wolves

Recommendation 1

We recommend a regulatory confirmation of the closure of hunting and trapping of wolves in the Townships of Bruton and Clyde, and the portion of the Township of Eyre within Algonquin Provincial Park.

The Bruton and Clyde Hunt Camp Association and registered trapline licence holders have agreed and complied with the prohibition on wolf hunting and trapping as set out in the Park Management Plan for the past 25 years. This recommendation is based on the premise that all wolves inside Algonquin Provincial Park should be protected.

Recommendation 2

We recommend that interim Hunting Agreements and any final agreement or settlement with the Algonquin First Nation of Ontario continue to exclude the hunting of wolves in Algonquin Provincial Park.

Recommendation 3

We recommend that any agreement or settlement with the Algonquins of Ontario continue to exclude the trapping of wolves in Algonquin Provincial Park consistent with the current longstanding practice of having a zero quota on the 19 aboriginal registered traplines in the eastern and central parts of the Park.

Recommendation 4

We recommend that Algonquin Provincial Park (MNR), in consultation with the Ontario Fur Managers Federation, develop a carefully defined policy and a protocol for the trapping and killing of wolves for research purposes that is consistent with and supports the conservation direction espoused in this report.

5.2.2 Management of Human and Wolf Interactions

Recommendation 5

We recommend that the Superintendent of Algonquin Provincial Park be delegated regulatory power to control activities by humans near wolf dens and rendezvous sites pursuant to Section 19 of The Provincial Parks Act, R.S.O. 1990.

Recommendation 6

We recommend that Algonquin Provincial Park (MNR) develop a policy on procedures to deal with fearless wolves with priority placed on human safety.

The increasing occurrence of fearless wolves occasionally presents a threat to human safety in Algonquin Provincial Park. Clear guidelines need to be developed for Park staff to address these threats.

5.2.3 Wolf and Prey Numbers and their Habitat

Recommendation 7

We recommend that a Wildlife Management Plan be developed for Algonquin Provincial Park that addresses the long-term, natural sustainability of the Park's wildlife species including wolves, their prey and habitat.

Recommendation 8

We recommend that the Algonquin Forestry Authority together with the Ministry of Natural Resources place a priority on the retention of conifer forest units that serve or have historically served as winter cover for moose and deer using the prescriptions of the Timber Management Guidelines for the provision of moose and deer habitat.

The Algonquin Forestry Authority will identify areas in and adjacent to this conifer cover where browse may be created. This can be done by reducing forest crown cover to 50-70% by selective removal of trees. These sites must be approved by the MNR biologist, and must be consistent with the proposed wildlife management plan.

Recommendation 9

We recommend that the Algonquin Forestry Authority together with the Ministry of Natural Resources explore tree harvest opportunities within warm-water riparian Areas of Concern (AOC) and at suitable upland sites near watercourses, consistent with the Timber Management Guidelines for the Protection of Fish Habitat, where it is perceived that this will benefit low or declining beaver populations.

The individual prescriptions for creating openings in conifer-dominated strips around waterbodies should not detract from their important function as wildlife travel corridors and cover.

Recommendation 10

We recommend no interference with natural disturbances such as wildfire of natural origin and indigenous insect and disease outbreaks in wilderness zones and, where appropriate, in natural zones and development zones that produce early succession forests (wolf, prey, habitat) unless those disturbances directly affect human safety, facilities or Algonquin Provincial Park values.

Recommendation 11

We recommend that the evaluation of the management in the Adaptive Management Plan be done through continuous and long-term effective monitoring of wolf population trends to ensure their sustainability.

The monitoring plan should be coordinated with the monitoring program recommended for outside the Park in Recommendation 19.

Recommendation 12

We recommend that a long-term continuous monitoring plan be developed and supported for the reliable and systematic assessment of deer, moose, and beaver population trends in Algonquin Provincial Park.

The monitoring plan should be coordinated with the monitoring program recommended for outside the Park in Recommendation 19.

Recommendation 13

We recommend a periodic assessment of the status of the wolves of Algonquin Provincial Park with respect to introgression of other *Canis* species, including *Canis latrans* (Coyote) and *Canis lupus* (Gray Wolf).

5.2.4 Education, Interpretation, Communication and Research

Recommendation 14

We recommend continued full support of the current education and interpretive programs that address the status, role and conservation of wolves in Algonquin Provincial Park, including the Public Wolf Howls and wolf education talks.

Enhanced interpretive presentations should be developed that describe the current efforts at conservation of the wolf and future developments as they occur.

Recommendation 15

We recommend a news release and a public consultation process describing the results and recommendations from the Minister's Algonquin Wolf Advisory Group report.

Recommendation 16

We recommend that the Algonquin Wolf Advisory Group should meet annually to review the effects of all the recommended actions that are implemented to conserve the wolves of Algonquin Provincial Park and report their findings to the Minister and the public.

Recommendation 17

We recommend the establishment and support of an Algonquin Science Cooperative to foster studies that address the natural sustainability of Algonquin Provincial Park ecosystems including wolves and their prey.

There is an ongoing need to assess the status of forest ecosystems as wildlife habitat in Algonquin Provincial Park, including the status of wolves and their prey populations. Studies, which address these needs, should be supported.

5.3 Recommendations for Management Outside Algonquin Provincial Park

5.3.1 Trapping and Hunting of Park Wolves Outside Algonquin Provincial Park

Human-caused mortality was identified as the major risk to the park wolf population. To reduce this mortality, AWAG considered the establishment of closed seasons for the hunting and trapping of wolves as part of an adaptive management plan.

Recommendation 18

We recommend the establishment of the following closed seasons for hunting and trapping of wolves in the designated townships surrounding Algonquin Provincial Park (illustrated in Figure 2) as part of an adaptive management plan:

18(1) We recommend maintaining the December 15 to March 31 closed seasons for hunting and trapping of wolves in the Townships of Hagarty, Richards and Burns.

The December 15 to March 31 closed seasons for hunting and trapping have been in place in these townships since 1993. They were implemented to reduce the human-caused mortality of park wolves that leave the park during the winter to seek deer in the deer winter concentration area located within these townships. The closed seasons

have been shown to be effective in decreasing winter mortality of park wolves in this known high-risk area.

18(2) We recommend closed seasons for the hunting and trapping of wolves that extend all year in the Townships of Finlayson, McClintock, Livingstone and Airy to protect the wolf packs at the east and west sides of Highway 60 corridor.

The packs of park wolves with territories along the Highway 60 corridor through Algonquin Provincial Park are very important to the park's internationally renowned interpretive program and to ecotourism in the area. For example, these wolf packs have been heard by many of the more than 110,000 people who have participated in the park's public wolf howls. Some of these packs have territories that extend outside of the park boundary into the Townships of Finlayson, McClintock and Livingstone at the southwest side of the park and the Township of Airy at the southeast side of the park. Consequently, these packs are vulnerable to hunting and trapping in these townships when they leave the protection of the park. Closing hunting and trapping within these townships will help ensure that these very important packs do not suffer even temporary disruption.

18(3) We recommend a closed season for the hunting of wolves that extends from December 16 to September 14 and a closed season for the trapping of wolves that extends from February 16 to October 24 in the following 33 whole and part townships surrounding Algonquin Provincial Park:

Wildlife Management Unit 48	
Ballantyne	*Chisholm*
Boulter	*Lauder*
Calvin	*Boyd*
Papineau	*Cameron*
Head	*Clara*
Maria	*Rolph*
Wylie	*McKay*
Wildlife Management Unit 50	
Paxton	*Butt*
McCraney	*Sinclair*
Franklin	
Wildlife Management Unit 54	
Havelock	*Eyre*
Harburn	

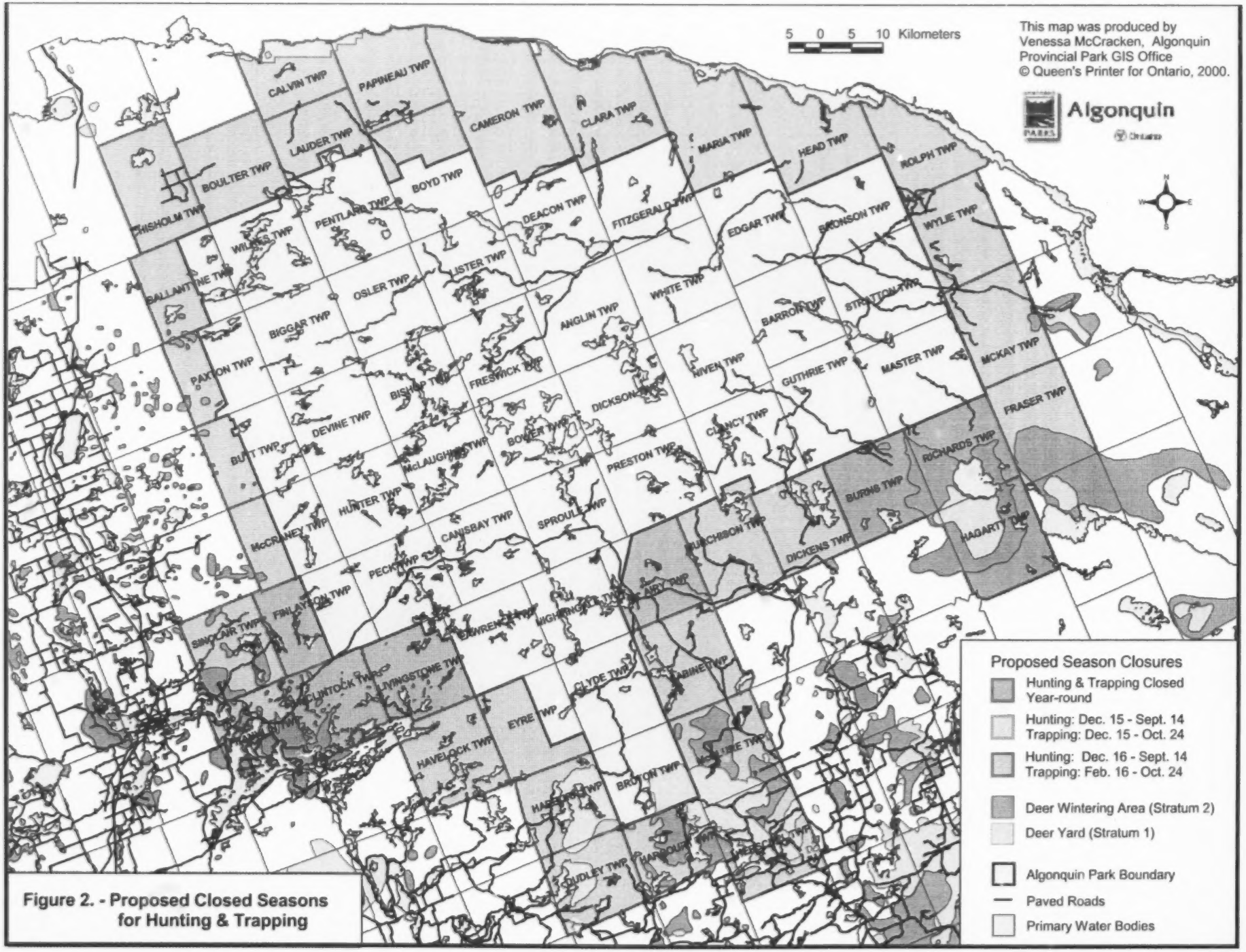

Figure 2. - Proposed Closed Seasons for Hunting & Trapping

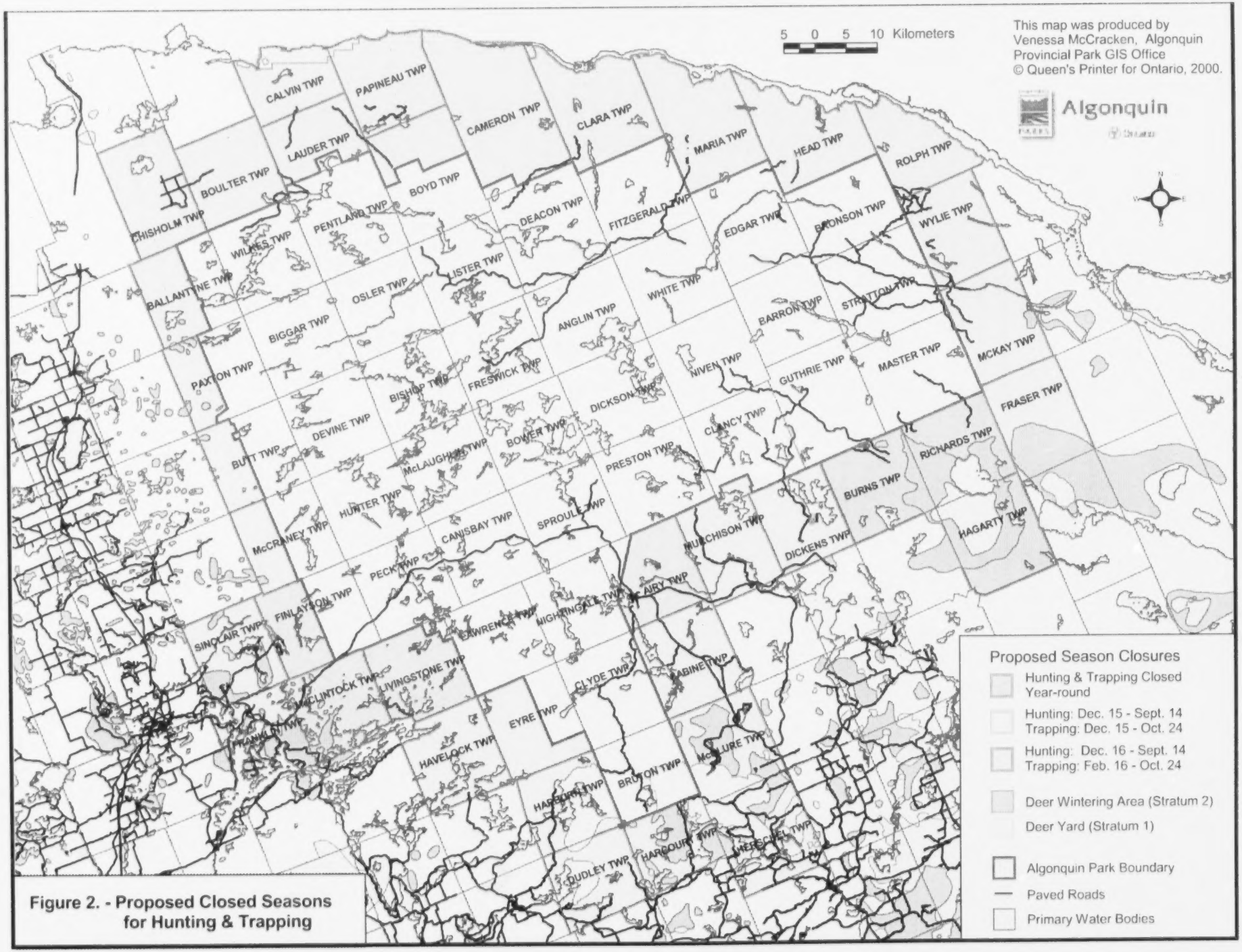

Figure 2. - Proposed Closed Seasons for Hunting & Trapping

Wildlife Management Unit 55A	
Sabine	*Murchison*
Dickens	
Wildlife Management Unit 55B	
Burns [1]	*Richards* [1]
Hagarty [1]	*Fraser*
Wildlife Management Unit 56	
Dudley	
Wildlife Management Unit 57	
Harcourt	*Herschel*
McClure	

The 3-month hunting season would continue to allow the harvest of wolves during the seasons for big game and small game. The 4-month trapping season would allow trapline management and the continued commercial harvest of wolves throughout the late fall and early winter. The closed seasons would be applied to 33 townships and part townships around the park, including 2 nearby townships that contain large winter deer yards that the park wolves are likely to visit. The closed seasons would not affect the killing of wolves that cause livestock depredation, as this activity is authorized under Section 31 of the Fish and Wildlife Conservation Act, 1997.

5.3.2 Wolf and Prey Assessment

Recommendation 19

We recommend that long-term continuous monitoring programs be developed and supported for reliable and systematic assessment of wolves and their prey (deer, beaver and moose) in Wildlife Management Units adjacent to the Park.

The monitoring programs should be coordinated with the monitoring plans recommended for inside the Park in Recommendation 11 and 12.

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[1] **The combined effect of recommendations 18(1) and 18(3) in the Townships of Hagarty, Richards and Burns will result in a closed season for the hunting of wolves that extends from December 15 to September 14 and a closed season for the trapping of wolves that extends from December 15 to October 24.**

Recommendation 20

We recommend enlisting the assistance of hunters to report the harvest of wolves in designated townships adjacent to the Park. Hunters could also be requested to voluntarily refrain from harvesting wolves in these townships. The continued cooperation of trappers in reporting their harvest of wolves will be very helpful in assessing the effects of management.

5.3.3 Public Education and Communication Programs

Recommendation 21

We recommend the development of outreach education programs closely coordinated with Algonquin Provincial Park programs to communicate the status, role and conservation of wolves in Algonquin Provincial Park, including their management. These programs should be targeted at both local and regional audiences and at educational institutions.

5.3.4 Management of the Greater Algonquin Ecosystem

Recommendation 22

We recommend that MNR continue to review broad-scale resource planning in the areas surrounding Algonquin Provincial Park. The Living Legacy initiative is an example of broad-scale resource planning that could help to ensure the future of wolves in Ontario. Such initiatives need to consider:

- **habitat linkages among populations of wolves;**
- **fragmentation of habitat, including road density and connectivity which affects wolves and other *Canis* species; and,**
- **resource management which will ensure the continued presence of populations of *Canis lycaon* across a large portion of central Ontario.**

6.0 Recommendation for the Management of Wolves in Ontario

Recommendation 23

We recommend that the Minister of Natural Resources consider the establishment of closed seasons for hunting and trapping of wolves that extend from approximately April to September throughout the geographical range of wolves in Ontario and excluding agricultural areas where coyotes predominate.

The open seasons for the hunting and trapping of wolves are currently open all year across Ontario. As such, wolves are one of the few game species that may be harvested year-round, a relic from the past when they were considered and treated as vermin. No closed season means that wolves are given no protection during the period when they breed and raise their young. Society find this lack of protection no longer acceptable, and there has been increased demand for providing species such as wolves with protection during part of their annual cycle. We therefore recommend the establishment of closed seasons for hunting and trapping that extend during the summer months to provide these animals with protection during this period. Summer season closures will not impact hunting and commercial trapping of wolves because their pelts are not prime at this time of the year. Additionally, this closed season will have no impact on agricultural interests as the killing of wolves that cause livestock depredation will continue to be authorized in defense of property under Section 31 of the Fish and Wildlife Conservation Act, 1997.

7.0 Overall Recommendation for the Management of Wolves in Ontario

Recommendation 24

We recommend that adequate resources are put in place to act on all accepted recommendations from this report, including compliance monitoring of regulatory changes and effects monitoring of the conservation strategy recommended in this report.

8.0 Acknowledgments

We would like to thank the following individuals for their significant contribution to our understanding of the scientific information, the historic and current management of wolves, their prey and habitat in and around Algonquin Provincial Park, and the many viewpoints and concerns on the long-term management of these wolves:

John Winters, Ray Bonenberg, Evan Thomas and Dan Elliott for their support of our work; John Deshane, Ed Reid and Rick Stronks for providing additional representation at meetings; Dr. John Vucetich and Dr. Paul Paquet for their detailed scientific analysis of the viability of the wolves of Algonquin Provincial Park; the participants of the PHVA workshop for sharing their expertise, view points and concerns; the Fish and Wildlife Branch of the Ministry of Natural Resources for providing the funding and administrative support that allowed us to do our work; the Ministry of Natural Resources, the many donors to World Wildlife Fund and the Canadian Wildlife Service for funding the PHVA workshop; the IUCN/SSC Conservation Breeding

Specialist Group for facilitating the PHVA workshop; the Friends of Algonquin Park for providing scientific support; Dr. Brad White, Dr. Paul Wilson, Mary Theberge, John Pisapio, Tim Haxton, Norm Quinn, Jeremy Inglis and Flytche Enterprises for providing us with valuable background information; Paul Wilson and Venessa McCracken for supplying the figures included in this report and Mary Theberge for contributing the cover art.

9.0 References

Ewins, P., M. de Almeida, P. Miller and O. Byers (eds.). 2000. Population and Habitat Viability Assessment Workshop for the Wolves of Algonquin Park: Final Report. IUCN/SSC Conservation Breeding Specialist Group: Apple Valley, MN., 151pp.

Vucetich, J.and P. Paquet. 2000. The demographic population viability of Algonquin wolves. Prepared for the Algonquin Wolf Advisory Group. 24pp.

Appendix A. Terms of Reference for the Algonquin Wolf Advisory Group

Algonquin Wolf Advisory Group

Terms of Reference

Purpose

To provide recommendations to the Minister of Natural Resources on an ***Adaptive Management Plan*** to ensure the long-term conservation of the eastern (Algonquin) gray wolves of *Algonquin Provincial Park* and surrounding areas.

The Plan would include:

a) a summary of what is known and what is not known about this wolf's ecology, behaviour, genetics, trends in population, predator prey relationships, trends in prey populations and habitat management
b) an assessment of human interaction with the wolf population in and around the Park
c) recommendations for management actions related to both wolves, their prey and habitat
d) identification of information and studies that are required to improve management capability
e) predictions about the results that might occur from a variety of management actions
f) a plan to evaluate and monitor the results of applying a variety of alternative management actions
g) identification of adaptations that will be implemented dependent on results of management actions
h) communication initiatives around the project.

Specific tasks

The Advisory Group will assess the concerns and knowledge about wolves in *Algonquin Provincial Park* and the surrounding area including:

- social and biological concerns about these wolves
- current and historic information available on wolf numbers and ecological relationships
- information related to mortality and reproduction of wolves
- information on movements and territories of wolves in relation to *Algonquin Provincial Park*, and
- historic and current genetic status of the Algonquin/eastern gray wolves in *Algonquin Provincial Park* with respect to coyotes and wolves outside the Park and to other wolves in North America.

An information seminar(s) will need to be held by the Advisory Group to obtain basic knowledge about what is known and unknown on wolf ecology, behaviour, genetics, predator prey relationships, trends in prey populations and habitat management. This would include information about the adaptive management process and how it can be used for management of the gray wolf. These meetings should include non-government organizations and Ministry of Natural Resources (MNR) representatives and experts.

The Group will also assess management alternatives such as:

- special management inside and near *Algonquin Provincial Park* related to prey species such as deer, beaver and moose
- implementation of regulation changes such as season length, quotas and mandatory reporting
- the effectiveness of seasonal closures of townships to the hunting and trapping of wolves, such as the winter closures currently in place in the Townships of Hagarty, Richards and Burns
- methods to reduce coyote interbreeding with wolves.

Membership

It is recommended that the Advisory Group be comprised of representatives from the diverse interests and include a member of each of the following groups (except where otherwise indicated):

- local citizens (3-4 members)
- Federation of Ontario Naturalists (FON)
- Ontario Federation of Anglers and Hunters (OFAH)
- Ontario Fur Managers Federation (OFMF)
- World Wildlife Fund (WWF)
- Wildlife Research Academic
- Ontario Parks
- Science Development and Transfer Branch, MNR
- Fish and Wildlife Branch, MNR

Chair

The Chair will be selected by the Minister of Natural Resources.

Location of Meetings

Meetings will be held in *Algonquin Provincial Park*, or other locations agreed by the group.

Minutes of Meetings

A record of meetings will be prepared by a designated member of the Advisory Group or by a professional note taker if requested by the Advisory Group.

Meeting Costs

Costs for meeting rooms, lunches and professional note taking services (if required) will be paid by the Ministry of Natural Resources.

Remuneration of Members

Each member organization will be responsible for the costs associated with expenses for travel, accommodation and other meals. The Ministry of Natural Resources will pay travel costs for non-affiliated members.

Per diems will not be provided to members.

Decision Making, Reporting and Approvals

The Advisory Group will consider both short-term actions (6 months) and longer-term (~3 year) plans.

Advisory Group recommendations will be arrived at by consensus.

The Chair will provide a list of recommendations (i.e., the Management Plan) to the Minister of Natural Resources within 6 months of the first meeting, and report to the Minister annually thereafter or as required. Annual reports will review results of management and alternative actions suggested by evaluations.

The Chair will keep the Director of the Fish and Wildlife Branch apprised of the Advisory Group's progress.